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IS 1157 (1957): Barley Powder [FAD 16: Foodgrains, Starches and Ready to Eat Foods]

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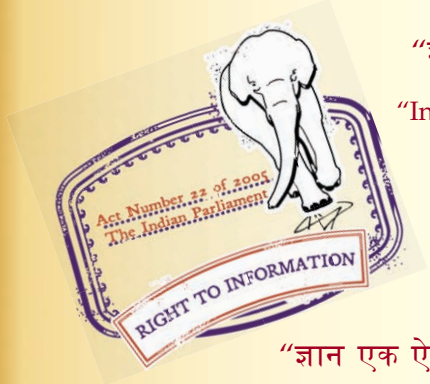

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS : 1157 - 1957
Reaffirmed 2010

Indian Standard

SPECIFICATION FOR BARLEY POWDER

U.D.C.
664·233 (083·75) (54)

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AMENDMENT NO. 1 JUNE 1965

TO

IS : 1157-1957 SPECIFICATION FOR BARLEY POWDER

Alterations

(*Clause* 3.1, *first sentence*) — Substitute the following for the existing sentence:

'3.1 The material shall be manufactured from sound and cleaned barley (*Hordeum vulgare* or H. *distichon*).'

(*Appendix* A) — Substitute the following for the existing appendix:

'APPENDIX A
(*Clause* 2.1)

SAMPLING OF BARLEY POWDER

A-1. GENERAL REQUIREMENTS OF SAMPLING

A-1.0 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

A-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

A-1.2 The sampling instrument shall be clean and dry when used.

A-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

A-1.4 The samples shall be placed in clean, odourless and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

A-1.5 Each container shall be sealed air-tight after filling and marked with full details of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

A-1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

A-1.7 Sampling shall be done by a person agreed to between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

A-2. SCALE OF SAMPLING

A-2.1 Lot — All the containers in a consignment belonging to the same batch of manufacture shall constitute a lot.

A-2.1.1 Samples shall be tested from each lot for ascertaining conformity of the material to the requirements of the specification.

A-2.2 The number of containers to be tested from a lot shall depend on the size of the lot and shall be in accordance with Table II.

TABLE II NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

Total Number of Containers in the Lot	Number of Containers to be Selected
N	n
(1)	(2)
3 to 50	3
51 ,, 200	4
201 ,, 400	5
401 ,, 650	6
651 and over	7

A-2.3 The containers to be selected for sampling shall be chosen at random from the lot and, for this purpose, random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

Starting from any container, count them as 1,2,3, ... up to r and so on, in a systematic manner. Every rth container thus counted shall be chosen, r being the integral part of N/n, where N is the total number of containers in the lot and n the number of containers to be selected (*see* Table II).

A-3. TEST SAMPLES AND REFEREE SAMPLES

A-3.1 Preparation of Individual Samples — Empty out the contents of the container on a sheet of paper and mix thoroughly. Cone and quarter as often as necessary till about 100 g of the material is left. From this take about 50 g of the material and divide it into three approximately equal parts. Each part so obtained shall constitute an individual sample representing the container and shall be transferred immediately to thoroughly clean and dry containers, sealed air-tight and labelled with particulars given in **A-1.5**. The individual samples so obtained shall be divided into three sets in such a way that each set has a sample representing each selected container. One of these sets shall be marked for the purchaser, the other for the vendor, and the third for the referee.

A-3.2 Preparation of a Composite Sample — From the material from each selected container remaining after the individual sample has been taken, equal quantities of the material shall be taken and mixed together so as to form a composite sample weighing not less than 60 g. This composite sample shall be divided into three approximately equal parts and transferred to clean and dry glass containers and labelled with the particulars given in **A-1.5**. One of these composite samples shall be marked for the purchaser, the other for the vendor, and the third for the referee.

A-3.3 Referee Samples — Referee samples shall consist of a set of individual samples (*see* **A-3.1**) and a composite sample (*see* **A-3.2**) marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place agreed between the two.

A-4. NUMBER OF TESTS

A-4.1 Tests for requirements in respect of protein and granularity shall be conducted on each of the samples constituting a set of individual test samples (*see* **A-3.1**).

A-4.2 Tests for the remaining characteristics, namely moisture, total ash, acid insoluble ash, crude fibre and alcoholic acidity, shall be conducted on the composite sample (*see* **A-3.2**).

A-5. CRITERIA FOR CONFORMITY

A-5.1 The lot shall be considered satisfactory in respect of the requirements of **A-4.1**, if each individual sample satisfies all the requirements.

A-5.2 The lot shall be considered satisfactory in respect of the requirements of **A-4.2**, if the test results on the composite sample satisfy the corresponding requirements.

A-5.3 The lot shall be declared to be in conformity with all the requirements of this specification, if it has been found satisfactory in accordance with **A-5.1** and **A-5.2.**'

(*Clause* **G-1.2**) — Substitute the following for the existing clause:

'**G-1.2 Standard Sodium Hydroxide Solution** — 0·05 N.'

(*Clause* **G-1.3**) — Substitute the following for the existing clause:

'**G-1.3 Phenolphthalein Indicator Solution** — Dissolve 0·1 g of phenolphthalein in 100 ml of 60 percent rectified spirit.'

(*Clause* **G-2.1**) — Substitute the following for the existing clause:

'**G-2.1** Weigh 5 g of the sample into a conical glass stoppered flask and add 50 ml of 90 percent alcohol (by volume) previously neutralized against phenolphthalein. Stopper, shake and allow to stand for 24 hours, with occasional shaking. Filter the alcoholic extract through a dry filter paper. Titrate 10 ml of the combined alcoholic extract against the standard sodium hydroxide using phenolphthalein as indicator. Calculate the percentage of alcoholic acidity as sulphuric acid.'

(*Clause* **G-3.1**, *line* 3) — Substitute $\frac{'24{\cdot}52 \quad AN'}{W}$

for $\frac{'12{\cdot}25 \quad AN'}{W}$

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Indian Standard

SPECIFICATION FOR BARLEY POWDER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 21 November 1957, on approval by the Agricultural and Food Products Division Council of the draft finalized on 23 September 1957, by the Edible Starches, Confectionery and Cereal Products Sectional Committee.

0.2 Barley powder is comparatively a much finer material than the whole-meal barley flour (which is known as *Jau-ka-Atta* in Hindi). Barley powder is manufactured by gradual reduction of barley grains, pearl barley or barley grits in roller milling process similar to that employed in milling wheat to *maida* (or flour). The material is also obtained as a by-product during the manufacture of pearl barley.

0.3 Specifications for barley powder have so far not been laid down by any organized body in any country, though references to its composition are met with in a number of books. The Sectional Committee responsible for the preparation of this standard has based it on the actual data available on the composition of barley powder as manufactured in India from imported as well as indigenous barley.

In addition to the above, due consideration has also been given to the relevant rules prescribed by the Government of India under the Prevention of Food Adulteration Act, 1954. Still this standard is subject to the restrictions imposed under that Act, wherever applicable.

0.4 This standard is one of the two Indian Standard Specifications for processed barley, the other specification is IS : 1156-1957 Pearl Barley.

0.5 This standard requires reference to the following Indian Standard Specifications:

IS: 265-1950 HYDROCHLORIC ACID

IS: 1070-1957 DISTILLED WATER

0.5.1 Wherever a reference to any specification mentioned under **0.5** appears in this standard, it shall be taken as a reference to the latest version of the specification.

0.6 The Government of India have decided to introduce throughout the country uniform weights and measures based on the metric system. Therefore, the quantities in this standard have been given in metric units.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS: 2-1949 Rules for Rounding Off Numerical Values; the number of places retained in the rounded off value should be the same as those of the specified value in the standard.

0.8 This standard is intended chiefly to cover the technical provisions relating to the supply of the material, and it does not include all the necessary provisions of a contract.

---

1. SCOPE

1.1 This standard prescribes the requirements and the methods of test for barley powder, as distinct from whole-meal barley flour.

2. SAMPLING

2.1 Representative samples of the material shall be drawn according to the method prescribed in Appendix A.

3. REQUIREMENTS

3.1 The material shall be manufactured essentially from sound and clean barley (*Hordeum vulgare*). It shall be whitish in colour and shall be free from fermented, musty or other objectionable taste and odour, adulterants and from insect and fungus infestation and rodent contamination.

NOTE — The colour, taste and odour shall be determined by organoleptic tests.

3.2 Microscopic Appearance — When the material is subjected to microscopic examination, starch granules shall have the characteristic appearance as shown in the photomicrograph reproduced in Fig 1, revealing more small granules than large ones, the hilum being absent and some of the largest ones showing striae.

3.3 The material shall also conform to the requirements given in Table I.

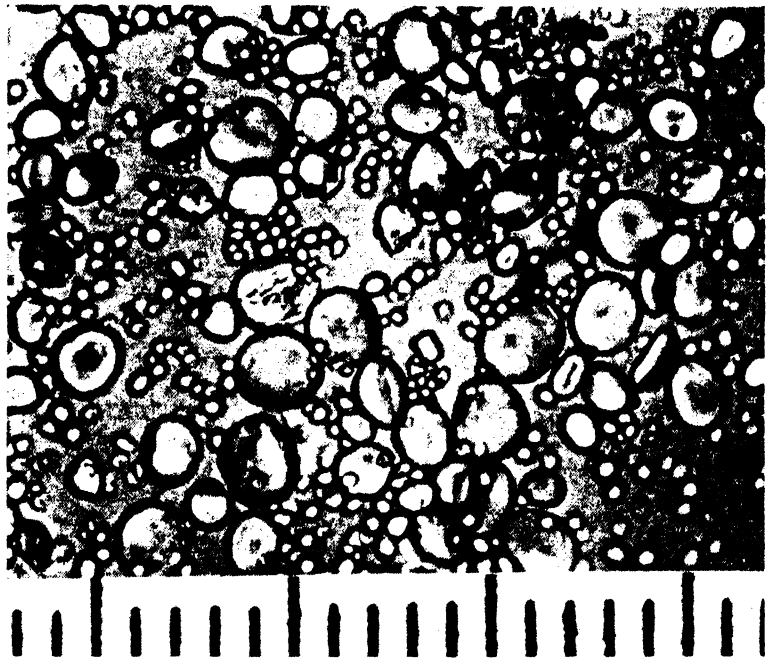

FIG 1 PHOTOMICROGRAPH OF BARLEY STARCH (*Hordeum vulgare*) (× 400)

(Scale: 1 division = 10 microns)

TABLE I REQUIREMENTS FOR BARLEY POWDER

(*Clause* 3.3)

SL NO.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO APPENDIX)
(1)	(2)	(3)	(4)
i)	Moisture, percent by weight, *max*	12·5	B
ii)	Total ash (on dry basis), percent by weight, *max*	1·0	C
iii)	Acid insoluble ash (on dry basis), percent by weight, *max*	0·05	D
iv)	Protein (on dry basis), percent by weight, *min*	7·0	E
v)	Crude fibre (on dry basis), percent by weight, *max*	0·50	F
vi)	Alcoholic acidity (as H_2SO_4) with 90 percent alcohol, percent by weight, *max*	0·10	G
vii)	Granularity	To satisfy the test	H

4. TESTS

4.1 Tests shall be carried out as prescribed under **3.1**, **3.2** and in the appropriate appendices specified in col 4 of Table I.

4.2 Quality of Reagents

4.2.1 Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (*see* IS : 1070-1957) shall be used where the use of water as a reagent is intended.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

5. PACKING AND MARKING

5.1 Packing — Unless otherwise agreed between the purchaser and the vendor, the material shall be packed in clean sound air-tight, tin plate containers or in other suitable air-tight containers.

5.2 Marking — The following particulars shall be clearly and indelibly marked on each container:

a) Name of the material,

b) Name of the manufacturer,

c) Batch or code number, and

d) Net weight.

5.2.1 Each container may also be marked with the ISI Standard Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, 1952 and the Rules and Regulations made thereunder. Details of conditions under which a licence for the use of ISI Certification Mark may be granted to manufacturers or processers may be obtained from the Indian Standards Institution.

APPENDIX A

(*Clause* 2.1)

SAMPLING OF BARLEY POWDER

A-1. GENERAL REQUIREMENTS OF SAMPLING

A-1.0 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

A-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

A-1.2 The sampling instrument shall be clean and dry when used.

A-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

A-1.4 The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

A-1.5 Each container shall be sealed air-tight after filling and marked with full details of sampling, date of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

A-1.6 Samples shall be stored in cush a manner that the temperature of the material does not vary unduly from the normal temperature.

A-1.7 Sampling shall be done by a person agreed between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

A-2. SCALE OF SAMPLING

A-2.1 Lot — All the containers in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

A-2.2 Gross Sample — For the purpose of drawing samples for test, a number of containers shall be selected at random from a lot. This number of containers in relation to the size of the lot, or the scale of sampling, shall be subject to an agreement between the purchaser and the vendor. As a guide to such an agreement, a scale of the size of the sample is suggested in Table II.

TABLE II MINIMUM NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING FROM VARIOUS SIZES OF LOTS

(*Clause* A-2.2)

Lot Size	Sample Size
2 to 8	2
9 ,, 27	3
28 ,, 64	4
65 ,, 125	5
126 ,, 216	6
217 ,, 343	7
344 ,, 512	8
513 ,, 729	9
730 ,, 1 000	10
1 001 ,, 1 331	11

A-3. TEST SAMPLES AND REFEREE SAMPLE

A-3.1 Preparation — Empty out the contents of the container on a sheet of paper and mix thoroughly. Cone and quarter as often as necessary till about 150 g of the material is left. This will constitute a composite sample for that container. Divide the composite sample of each container into three samples, each being reduced sample for that container. A set of such reduced samples consisting of one reduced sample for each container shall constitute the test sample.

A-3.2 Three sets of test samples, each sample being not less than 50 g shall be transferred immediately to thoroughly clean and dry containers and sealed air-tight. This shall be labelled with particulars given under **A-1.5**. One set of test samples shall be sent to the purchaser and one to the vendor.

A-3.3 Referee Sample — The third set of test samples, bearing seals of the purchaser and the vendor, shall constitute the referee sample, to be used in case of dispute between the purchaser and the vendor. It shall be kept at a place agreed between the purchaser and the vendor.

A-4. TEST FOR ACCEPTANCE

A-4.1 Examination and Tests — The purchaser may examine and test each of the reduced samples constituting a test sample separately for compliance with the requirements of this standard or he may prepare, for the purpose of such examination and at any stage of the progress of the examination, a composite sample representative of the whole lot, by mixing all the reduced samples constituting the test sample.

A-4.2 Criterion for Judgement — When the individual reduced samples in a test sample are separately examined and the results vary from one reduced sample to another, the criterion for judging the quality of the lot for the purpose of acceptance on the basis of the results obtained shall be at the discretion of the purchaser, unless otherwise previously agreed between the purchaser and the vendor.

APPENDIX B

[*Table* I, *Item* (i)]

DETERMINATION OF MOISTURE

B-1. PROCEDURE

B-1.1 Weigh accurately about 5 g of the material in a suitable dish, made of porcelain, silica or platinum, previously dried in an electric oven and weighed. Place the dish in an electric oven maintained at 105° ± 1°C, for five hours. Cool the dish in a desiccator and weigh with the lid on. Repeat the process of heating, cooling and weighing at half hour intervals until the loss in weight between two successive weighings is less than one milligram. Record the lowest weight obtained.

NOTE — Preserve the dish containing this dried material for the determination of total ash (*see* **C-1.1**).

B-2. CALCULATION

B-2.1 Moisture, percent by weight $= \frac{100\ (W_1 - W_2)}{W_1 - W}$

where

W_1 = weight in g of the dish with the material before drying,

W_2 = weight in g of the dish with the material after drying, and

W = weight in g of the empty dish.

APPENDIX C

[*Table* I, *Item* (ii)]

DETERMINATION OF TOTAL ASH

C-1. PROCEDURE

C-1.1 Ignite the dried material in the dish (*see* **B-1.1**) with the flame of a Meker burner for about one hour. Complete the ignition by keeping in a muffle furnace at 600° ± 20°C until grey ash results. Cool in a desiccator and weigh. Repeat the process of igniting, cooling and weighing at half hour intervals until the difference in weight between two successive weighings is less than one milligram. Note the lowest weight.

NOTE — Preserve the dish containing this ash for the determination of acid insoluble ash (*see* **D-2.1**).

C-2. CALCULATION

C-2.1 Total ash (on dry basis), percent by weight $= \frac{100\ (W_2 - W)}{W_1 - W}$

where

W_2 = weight in g of the dish with the ash,

W = weight in g of the empty dish, and

W_1 = weight in g of the dish with the dried material (*see* W_2 under **B-2.1**).

APPENDIX D

[*Table* I, *Item* (iii)]

DETERMINATION OF ACID INSOLUBLE ASH

D-1. REAGENT

D-1.1 Dilute Hydrochloric Acid — approximately 5 N, prepared from concentrated hydrochloric acid (*see* IS : 265-1950).

D-2. PROCEDURE

D-2.1 To the ash contained in the dish (*see* **C-1.1**), add 25 ml of dilute hydrochloric acid, cover with a watch glass and heat on a water bath for 10 minutes. Allow to cool and filter the contents of the dish through Whatman filter paper No. 42 or its equivalent. Wash the filter paper with water until the washings are free from the acid and return it to the dish. Keep it in an electric air oven maintained at 135° ± 2°C for about 3 hours. Ignite in a muffle furnace at 600° ± 20°C for one hour. Cool the dish in a desiccator and weigh. Repeat the process of igniting in the muffle furnace, cooling and weighing at half hour intervals until the difference in weight between

two successive weighings is less than one milligram. Note the lowest weight.

D-3. CALCULATION

D-3.1 Acid insoluble ash (on dry basis), percent by weight $= \frac{100\ (W_2 - W)}{W_1 - W}$

where

W_2 = weight in g of the dish with the acid insoluble ash,

W = weight in g of the empty dish, and

W_1 = weight in g of the dish with the dried material (*see* W_2 under **B-2.1**).

APPENDIX E

[*Table* I, *Item* (iv)]

DETERMINATION OF PROTEIN

E-1. APPARATUS

E-1.1 Kjeldahl Flask — 500 ml capacity.

E-1.2 Distillation Assembly — The assembly consists of a round bottom flask of 1 000 ml capacity fitted with a rubber stopper through which passes one end of the connecting bulb tube. The other end of the bulb tube is connected to the condenser which is attached by means of a rubber tube to a dip tube which dips into a known quantity of standard sulphuric acid contained in a beaker of 250 ml capacity.

E-2. REAGENTS

E-2.0 The following reagents are required.

E-2.1 Anhydrous Sodium Sulphate

E-2.2 Copper Sulphate

E-2.3 Concentrated Sulphuric Acid — sp-gr 1·84.

E-2.4 Sodium Hydroxide Solution — Dissolve about 225 g of sodium hydroxide in 500 ml of water.

E-2.5 Standard Sulphuric Acid — approximately 0·1 N.

E-2.6 Methyl Red Indicator Solution — Dissolve one gram of methyl red in 200 ml of rectified spirit (95 percent by volume).

E-2.7 Standard Sodium Hydroxide Solution — approximately 0·1 N.

E-3. PROCEDURE

E-3.1 Transfer carefully about one gram of the material accurately weighed, to the Kjeldahl flask, taking precaution to see that particles of the material do not stick in the neck of the flask. Add about 10 g of anhydrous sodium sulphate, about 0·2 to 0·3 g of copper sulphate and 20 ml of concentrated sulphuric acid. Place the flask in an inclined position. Heat below the boiling point of the acid until frothing ceases. Increase heat until acid boils vigorously and digest for 30 minutes after the mixture becomes pale green or colourless. Cool the contents of the flask. Transfer quantitatively to the round bottom flask, with water, the total quantity of water used being about 200 ml. Add with shaking a few pieces of pumice stone to prevent bumping. Add about 50 ml of sodium hydroxide solution (which is sufficient to make the solution alkaline) carefully through the side of the flask so that it does not mix at once with the acid solution but forms a layer below the acid layer. Assemble the apparatus taking care that the tip of condenser extends below the surface of standard sulphuric acid contained in the beaker. Mix the contents of the flask by shaking and distil until all ammonia has passed over into the standard sulphuric acid. Shut off the burner and immediately detach the flask from the condenser. Rinse the condenser thoroughly with water into the beaker. Wash the tip carefully so that all traces of the condensate are transferred to the beaker. When all the washings have drained into the beaker, add two or three drops of methyl red indicator solution and titrate with standard sodium hydroxide solution.

E-3.2 Carry out a blank determination using all reagents in the same quantities but without the material to be tested.

E-4. CALCULATION

E-4.1 Protein (on dry basis), percent by weight $= \frac{87\,500\,(B - A)N}{W\,(100 - M)}$

where

B = volume in ml of standard sodium hydroxide solution used to

neutralize the acid in the blank determination,

A = volume in ml of standard sodium hydroxide solution used to neutralize the excess of acid in the test with the material,

N = normality of the standard sodium hydroxide solution,

W = weight in g of the material taken for the test, and

M = moisture percent by weight of the material (*see* **B-2.1**).

APPENDIX F

[*Table* I, *Item* (v)]

DETERMINATION OF CRUDE FIBRE

F-1. REAGENTS

F-1.0 The following reagents are required.

F-1.1 Dilute Sulphuric Acid — 1·25 percent (*w/v*), accurately prepared.

F-1.2 Sodium Hydroxide Solution — 1·25 percent (*w/v*), accurately prepared.

F-1.3 Ethyl Alcohol — 95 percent by volume.

F-2. PROCEDURE

F-2.1 Dry to constant weight about 5 g of the material in an electric air oven at 105° ± 1°C. Weigh accurately about 2·5 g of the dried material into a thimble and extract for about one hour with petroleum ether, using Soxhlet apparatus. Transfer the fat-free material to a litre flask. Take 200 ml of dilute sulphuric acid in a beaker and bring to boil. Transfer the whole of the boiling acid to flask containing the fat-free material and immediately connect the flask with a reflux water condenser and heat, so that the contents of the flask begin to boil within one minute. Rotate the flask frequently, taking care to keep the material from remaining on the sides of the flask out of contact with the acid. Continue boiling for exactly 30 minutes. Remove the flask and filter through fine linen (about 18 threads to the centimetre) held in a funnel, and wash with boiling water until the washings are no longer acid to litmus. Bring some quantity of sodium hydroxide solution to boiling under reflux condenser. Wash the residue on the linen into the flask with 200 ml of the boiling sodium hydroxide solution. Immediately connect the flask with the reflux condenser and boil for exactly 30 minutes. Remove the flask and immediately filter through the filtering cloth. Thoroughly wash the residue with boiling water and transfer to a Gooch crucible prepared with a thin but compact layer of ignited asbestos. Wash the residue thoroughly first with hot water and then with about 15 ml of ethyl alcohol, 95 percent by volume. Dry the Gooch crucible and contents at 105° ± 1°C in the air oven to constant weight. Cool and weigh. Incinerate the contents of the Gooch crucible in an electric muffle furnace at 600° ± 20°C until all the carbonaceous matter is burnt. Cool the Gooch crucible containing the ash in a desiccator and weigh.

F-3. CALCULATION

F-3.1 Crude fibre (on dry basis), percent by weight $= \frac{100\ (W_1 - W_2)}{W}$

where

W_1 = weight in g of Gooch crucible and contents before ashing,

W_2 = weight in g of Gooch crucible containing asbestos and ash, and

W = weight in g of the dried material taken for the test.

APPENDIX G

[*Table* I, *Item* (vi)]

DETERMINATION OF ALCOHOLIC ACIDITY

G-1. REAGENTS

G-1.0 The following reagents are required.

G-1.1 Neutral Ethyl Alcohol — 90 percent by volume.

G-1.2 Standard Alcoholic Sodium Hydroxide Solution — approximately 0·02 N.

G-1.3 Curcuma Indicator Solution — one percent (*w/v*) in ethyl alcohol.

G-2. PROCEDURE

G-2.1 Weigh accurately about 5 g of the material into a 100 ml conical flask provided with a ground glass stopper and add 25 ml of the neutral alcohol. Allow to digest for 24 hours with occasional shaking. Pipette 10 ml of the supernatant liquid into a conical flask and titrate with the standard alcoholic sodium hydroxide using the curcuma indicator solution. The end point is indicated when the solution turns to chamois colour.

G-3. CALCULATION

G-3.1 Alcoholic acidity (as H_2SO_4) with 90 percent alcohol, percent by weight $= \frac{12{\cdot}25\ AN}{W}$

where

A = volume in ml of standard alcoholic sodium hydroxide solution used in titration,

N = normality of standard alcoholic sodium hydroxide solution, and

W = weight in g of the material taken for the test.

APPENDIX H

[*Table* I, *Item* (vii)]

DETERMINATION OF GRANULARITY

H-1. APPARATUS

H-1.1 Sieves — A nest of two sieves, both made of ' double extra silk ' — upper one 0 XX (aperture width 0·523 mm) and lower one 15 XX (aperture width 0·089 mm).

H-2. PROCEDURE

H-2.1 Transfer about 10 g of the material, accurately weighed, to the upper sieve and sieve for two minutes. Brush the upper surface of the sieve and sieve again for one minute. Weigh the material retained on both the sieves.

H-2.2 The material shall be deemed to satisfy the requirement of the test, if no material is retained on the upper sieve and not more than 30 percent by weight is retained on the lower sieve.

H-3. CALCULATION

H-3.1 Material retained, percent by weight $= \frac{100\ W_2}{W_1}$

where

W_2 = weight in g of the material retained on the sieve, and

W_1 = weight in g of the material taken for the test.

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